

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES**

In re Patent Application of:)	Mail Stop Appeal Brief - Patents
)	
Alok SHARMA)	Group Art Unit: 2426
)	
Application No.: 09/800,397)	Examiner: J. Zhong
)	
Filed: March 5, 2001)	
)	
For: TRANSCEIVER CHANNEL BANK)	
WITH REDUCED CONNECTOR)	
DENSITY)	

APPEAL BRIEF

U.S. Patent and Trademark Office
Customer Window, Mail Stop Appeal Brief - Patents
Randolph Building
401 Dulany Street
Alexandria, Virginia 22314

Sir:

This Appeal Brief is submitted in response to the non-final Office Action, dated April 14, 2010, in support of the Notice of Appeal with Pre-Brief Request for Review, filed July 14, 2010, and after the Notice of Panel Decision, dated August 23, 2010.

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I. REAL PARTY IN INTEREST

The real party in interest of the present application, solely for purposes of identifying and avoiding potential conflicts of interest by board members due to working in matters in which the member has a financial interest is JUNIPER NETWORKS, INC., which is an assignee of record of the present application.

II. RELATED APPEALS AND INTERFERENCES

Appellant is unaware of any related appeals, interferences, or judicial proceedings.

III. STATUS OF CLAIMS

Claims 1, 3-10, 12-17, and 22-40 are pending in the present application. Claims 2, 11, and 18-21 were previously canceled without prejudice or disclaimer. Claims 1, 3-10, 12-17, and 22-40 were rejected in the non-final Office Action, dated April 14, 2010, and are the subject of the present appeal. Claims 1, 3-10, 12-17, and 22-40 are reproduced in the Claim Appendix of this Appeal Brief.

IV. STATUS OF AMENDMENTS

No Amendment has been filed subsequent to the non-final Office Action mailed April 14, 2010.

V. SUMMARY OF THE CLAIMED SUBJECT MATTER

The following summary of the presently claimed subject matter indicates certain portions of the specification (including the drawings) that provide examples of embodiments of elements of the claimed subject matter. It is to be understood that other portions of the specification not cited herein may also provide examples of embodiments of elements of the claimed subject matter. It is also to be understood that the indicated examples are merely examples, and the scope of the claimed subject matter includes alternative embodiments and equivalents thereof. References herein to the specification are thus intended to be exemplary and not limiting.

Claim 1 recites: a method for provisioning multiple digital receivers, comprising: providing an analog to digital converter having an analog input and a digital output (*see, e.g.,* original claim 1; Fig. 9 (500)); providing a plurality of digital receivers, each receiver having a programmable center frequency (*see, e.g.,* original claim 1; Fig. 9 (250); p. 11, lines 19-21), where the plurality of digital receivers are to receive digitized samples from the analog to digital converter and where each of the plurality of digital receivers includes a low-pass digital filter (*see, e.g.,* Fig. 9 (500, 250); p. 11, lines 10-12; p. 13, lines 1-3); maintaining pre-computed sets of filter coefficients in non-volatile storage, each set corresponding to one of the plurality of low-pass digital filters, each filter having one of a predetermined set of bandwidths (*see, e.g.,* original claim 2; p. 11, lines 10-12); receiving a request to provision a selected one of the plurality of digital receivers (*see, e.g.,* p. 13, lines 1-3; Fig. 13 (1350)); selecting a first center frequency and a first bandpass bandwidth for provisioning the selected one of the plurality of digital receivers (*see, e.g.,* original claim 2; p. 14, lines 2-4); retrieving the filter coefficients associated with the first bandpass bandwidth (*see, e.g.,* original claim 2; p. 13, lines 20-22); subjecting the retrieved filter coefficients to a bandpass transformation corresponding to the first center frequency (*see, e.g.,* original claim 2; p. 14, lines 2-4); and loading

the transformed filter coefficients into coefficient latches in the selected one of the plurality of digital receivers (*see, e.g.*, original claim 2; p. 14, lines 4-6).

Claim 24 recites: a system for provisioning multiple digital receivers, comprising: an analog to digital converter having an analog input and a digital output (*see, e.g.*, original claim 1; Fig. 9 (500)); a plurality of digital receivers, each of the plurality of digital receivers having a programmable center frequency, and each of the plurality of digital receivers including a low-pass digital filter (*see, e.g.*, original claim 1; Fig. 9 (250); p. 11, lines 19-21); means for coupling digitized samples to the plurality of digital receivers (*see, e.g.*, Fig. 9 (500, 250); p. 11, lines 10-12; p. 13, lines 1-3); means for maintaining pre-computed sets of filter coefficients in non-volatile storage, each set corresponding to one of plurality of low-pass digital filters, each filter having one of a predetermined set of bandwidths (*see, e.g.*, original claim 2; p. 11, lines 10-12); means for receiving a request to provision a selected one of the plurality of digital receivers (*see, e.g.*, p. 13, lines 1-3; Fig. 13 (1350)); means for selecting a first center frequency and a first bandpass bandwidth for provisioning the selected one of the plurality of digital receivers (*see, e.g.*, original claim 2; p. 14, lines 2-4); means for retrieving the filter coefficients associated with the first bandpass bandwidth (*see, e.g.*, original claim 2; p. 13, lines 20-22); means for subjecting the retrieved filter coefficients to a bandpass transformation corresponding to the first center frequency (*see, e.g.*, original claim 2; p. 14, lines 2-4); and means for loading the transformed filter coefficients into coefficient latches in the selected one of the plurality of digital receivers (*see, e.g.*, original claim 2; p. 14, lines 4-6).

VI. GROUND'S OF REJECTION TO BE REVIEWED ON APPEAL

- A. Claims 1, 3, 4, 16, 17, 22-26, and 37-40 stand rejected under 35 U.S.C. § 103(a) as unpatentable over BARHAM et al. (U.S. Patent No. 6,721,371), in view of YASUDA et al. (U.S. Patent No. 6,466,913), and further in view of PROAKIS et al. ("Digital Signal Processing: Principles, Algorithms, and Applications," ISBN 0133737624, 1996).
- B. Claims 8 and 36 stand rejected under 35 U.S.C. § 103(a) as unpatentable over BARHAM et al., in view of YASUDA et al., further in view of PROAKIS et al., and further in view of DUNLOP et al. (U.S. Patent No. 6,721,872).
- C. Claims 5-7, 13, 27-29, and 33 stand rejected under 35 U.S.C. § 103(a) as unpatentable over BARHAM et al., in view of YASUDA et al., further in view of PROAKIS et al., and still further in view of QUIGLEY et al. (U.S. Patent No. 6,650,624).
- D. Claims 14, 15, 34, and 35 stand rejected under 35 U.S.C. § 103(a) as unpatentable over BARHAM et al., in view of YASUDA et al., further in view of PROAKIS et al., further in view of QUIGLEY et al., and still further in view of PEYROVIAN (U.S. Patent No. 5,768,682).
- E. Claims 9, 10, 12, and 30-32 stand rejected under 35 U.S.C. § 103(a) as unpatentable over BARHAM et al., in view of YASUDA et al., further in view of PROAKIS et al., further in view of QUIGLEY et al., and still further in view of Appellant's Fig. 17(A).

VII. ARGUMENTS

A. The rejection of claims 1, 3, 4, 16, 17, 22-26, and 37-40 under 35 U.S.C. § 103(a) as unpatentable over BARHAM et al., in view of YASUDA et al., and further in view of PROAKIS et al. should be reversed.

The initial burden of establishing a *prima facie* basis to deny patentability to a claimed invention always rests upon the Examiner. In re Oetiker, 977 F.2d 1443, 24 U.S.P.Q.2d 1443 (Fed. Cir. 1992). In rejecting a claim under 35 U.S.C. § 103, the Examiner must provide a factual basis to support the conclusion of obviousness. In re Warner, 379 F.2d 1011, 154 U.S.P.Q. 173 (C.C.P.A. 1967). Based upon the objective evidence of record, the Examiner is required to make the factual inquiries mandated by Graham v. John Deere Co., 86 S. Ct. 684, 383 U.S. 1, 148 U.S.P.Q. 459 (1966). KSR International Co. v. Teleflex Inc., 550 U.S. 398, 127 S. Ct. 1727 (2007). The Examiner is also required to explain how and why one having ordinary skill in the art would have been realistically motivated to modify an applied reference and/or combine applied references to arrive at the claimed invention. Uniroyal, Inc. v. Rudkin-Wiley Corp., 837 F.2d 1044, 5 U.S.P.Q.2d 1434 (Fed. Cir. 1988).

1. Claims 1, 3, 4, 16, 17, 22, and 23

Claim 1 is directed to a method for provisioning multiple digital receivers. The method includes providing an analog to digital converter having an analog input and a digital output; providing a plurality of digital receivers, each receiver having a programmable center frequency, where the plurality of digital receivers are to receive digitized samples from the analog to digital converter and where each of the plurality of digital receivers includes a low-pass digital filter; maintaining pre-computed sets of filter coefficients in non-volatile storage, each set corresponding to one of the plurality of low-pass digital filters, each filter having one of a predetermined set of bandwidths; receiving a request to provision a selected one of the plurality of digital receivers;

selecting a first center frequency and a first bandpass bandwidth for provisioning the selected one of the plurality of digital receivers; retrieving the filter coefficients associated with the first bandpass bandwidth; subjecting the retrieved filter coefficients to a bandpass transformation corresponding to the first center frequency; and loading the transformed filter coefficients into coefficient latches in the selected one of the plurality of digital receivers. BARHAM et al., YASUDA et al., and PROAKIS et al., whether taken alone or in any reasonable combination, do not disclose or suggest one or more of these features.

For example, BARHAM et al., YASUDA et al., and PROAKIS et al. do not disclose or suggest **retrieving filter coefficients associated with a first bandpass bandwidth**, as recited in claim 1. The Examiner concedes that BARHAM et al. does not disclose this feature, and relies on col. 7, lines 1-9 and 50-67 of YASUDA et al. for allegedly disclosing this feature of claim 1 (non-final Office Action, pp. 4-5). Appellant submits that neither these sections nor any other sections of YASUDA et al. disclose or suggest the above feature of claim 1. Therefore, the Examiner has not established a *prima facie* case of obviousness with respect to claim 1.

At col. 6, line 63-col. 7, line 9, YASUDA et al. discloses:

The right-channel filter module 304 includes an analog-to-digital converter (ADC) 311, a digital FIR filter 312a, a digital FIR filter 312b, a coefficient buffer 313a, a coefficient buffer 313b, a digital-to-analog converter (DAC) 314a, a digital-to-analog converter (DAC) 314b, and a fader 315. The ADC 311 inputs an analog right-channel sound signal (R CH INPUT), and converts the input signal into a digital signal. The ADC 311 supplies the digital signal to each of the inputs of the FIR filter 312a and the FIR filter 312b. The coefficient buffer 313a stores filter coefficients of the FIR filter 312a which are read from the coefficient ROM 302 and transmitted by the CPU 301. The coefficient buffer 313b stores filter coefficients of the FIR filter 312b which are read from the coefficient ROM 302 and transmitted by the CPU 301.

This section of YASUDA et al. discloses that a "coefficient buffer 313b stores filter coefficients of [an] FIR filter 312b." YASUDA et al. does not disclose or suggest that these filter coefficients of the FIR filter 312b are, or could be, associated with a bandpass bandwidth. In fact, YASUDA et al. does not disclose a bandpass bandwidth at all. Therefore, YASUDA et al. does not disclose or

suggest retrieving filter coefficients associated with a first bandpass bandwidth, as recited in claim 1.

Appellant submits that the disclosure of PROAKIS et al. does not remedy the deficiencies in the disclosures of BARHAM et al. and YASUDA et al. identified above.

Since BARHAM et al., YASUDA et al., and PROAKIS et al. do not disclose or suggest retrieving filter coefficients associated with a first bandpass bandwidth, BARHAM et al., YASUDA et al., and PROAKIS et al. cannot reasonably be construed as disclosing or suggesting **subjecting the retrieved filter coefficients (which are associated with a first bandpass bandwidth) to a bandpass transformation corresponding to a first center frequency**, as also recited in claim 1.

Therefore, the alleged combination of BARHAM et al., YASUDA et al., and PROAKIS et al. could not fairly be construed to disclose the above-mentioned feature of claim 1. Furthermore, Appellant asserts that the reasons for combining BARHAM et al., YASUDA et al., and PROAKIS et al. do not satisfy the requirements of 35 U.S.C. § 103.

For example, with respect to the reasons for combining BARHAM et al. with YASUDA et al., the Examiner alleges (non-final Office Action, p. 5):

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have coefficients storage as taught by Yasuda to the FIR filter of Barham in order to provide an FIR filter that is capable filtering variety of frequency ranges by change the coefficients and without change the hardware.

Appellant submits that the Examiner's allegation is merely a conclusory statement of an alleged benefit of the combination. Such conclusory statements have been repeatedly held to be insufficient for establishing a *prima facie* case of obviousness. In this respect, Appellant relies upon KSR International Co. v. Teleflex Inc., 550 U.S. 398, 82 U.S.P.Q.2d 1385 (2007) (citing In re Kahn, 441 F.3d 977, 988, 78 U.S.P.Q.2d 1329 (Fed. Cir. 2006)), where it was held that rejections on obviousness grounds cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness.

Furthermore, the Examiner does not explain how combining YASUDA et al.'s alleged coefficient storage with BARHAM et al.'s alleged FIR filter would provide the alleged benefit. Therefore, the Examiner's allegations fall short of providing the articulated reasoning required by KSR.

Additionally, with respect to the reasons for combining PROAKIS et al. with the alleged combination of BARHAM et al. and YASUDA et al., the Examiner asserts (non-final Office Action, p. 5):

[I]t would have been obvious to one of ordinary skill in the art at the time the invention was made to have bandpass transformation as taught by Proakis to the FIR filter of Barham as modified by Yasuda in order to provide an FIR filter that can perform frequency transformations either in analog or digital domain.

As with the Examiner's earlier allegation, Appellant submits that this allegation is merely a conclusory statement of an alleged benefit of the combination, which is insufficient for establishing a *prima facie* case of obviousness (*see KSR*, 550 U.S. at 398, 82 U.S.P.Q.2d at 1385 (citing Kahn, 441 F.3d at 988, 78 U.S.P.Q.2d at 1329)). Furthermore, the Examiner does not explain how combining PROAKIS et al.'s alleged bandpass transformation with BARHAM et al. and YASUDA et al.'s alleged FIR filter would provide the alleged benefit. Therefore, the Examiner's allegations fall short of providing the articulated reasoning required by KSR.

For at least the foregoing reasons, Appellant submits that the rejection of claim 1 under 35 U.S.C. § 103(a) based on YASUDA et al., BARHAM et al., and PROAKIS et al. is improper. Accordingly, Appellant requests that the rejection be reversed.

Claims 3, 4, 16, 17, 22, and 23 depend from claim 1. Therefore, Appellant requests that the rejection of these claims be reversed for at least the reasons given above with respect to claim 1.

2. Claims 24-26 and 37-40

Claim 24 is directed to a system for provisioning multiple digital receivers, comprising an analog to digital converter having an analog input and a digital output; a plurality of digital

receivers, each of the plurality of digital receivers having a programmable center frequency, and each of the plurality of digital receivers including a low-pass digital filter; means for coupling digitized samples to the plurality of digital receivers; means for maintaining pre-computed sets of filter coefficients in non-volatile storage, each set corresponding to one of plurality of low-pass digital filters, each filter having one of a predetermined set of bandwidths; means for receiving a request to provision a selected one of the plurality of digital receivers; means for selecting a first center frequency and a first bandpass bandwidth for provisioning the selected one of the plurality of digital receivers; means for retrieving the filter coefficients associated with the first bandpass bandwidth; means for subjecting the retrieved filter coefficients to a bandpass transformation corresponding to the first center frequency; and means for loading the transformed filter coefficients into coefficient latches in the selected one of the plurality of digital receivers. BARHAM et al., YASUDA et al., and PROAKIS et al., whether taken alone or in any reasonable combination, do not disclose or suggest one or more of these features.

For example, BARHAM et al., YASUDA et al., and PROAKIS et al. do not disclose or suggest **means for retrieving filter coefficients associated with a first bandpass bandwidth**, as recited in claim 24. The Examiner concedes that BARHAM et al. does not disclose this feature, and relies on col. 7, lines 1-9 and 50-67 of YASUDA et al. for allegedly disclosing this feature of claim 24 (non-final Office Action, pp. 4-5, 9). Appellant submits that neither these sections nor any other sections of YASUDA et al. disclose or suggest the above feature of claim 24. Therefore, the Examiner has not established a *prima facie* case of obviousness with respect to claim 24.

At col. 6, line 63-col. 7, line 9 (reproduced above), YASUDA et al. discloses that a "coefficient buffer 313b stores filter coefficients of [an] FIR filter 312b." YASUDA et al. does not disclose or suggest that these filter coefficients of the FIR filter 312b are, or could be, associated with a bandpass bandwidth. In fact, YASUDA et al. does not disclose a bandpass bandwidth at all.

Therefore, YASUDA et al. does not disclose or suggest means for retrieving filter coefficients associated with a first bandpass bandwidth, as recited in claim 24.

Appellant submits that the disclosure of PROAKIS et al. does not remedy the deficiencies in the disclosures of BARHAM et al. and YASUDA et al. identified above.

Since BARHAM et al., YASUDA et al., and PROAKIS et al. do not disclose or suggest means for retrieving filter coefficients associated with a first bandpass bandwidth, BARHAM et al., YASUDA et al., and PROAKIS et al. cannot reasonably be construed as disclosing or suggesting **means for subjecting the retrieved filter coefficients (which are associated with a first bandpass bandwidth) to a bandpass transformation corresponding to a first center frequency,** as also recited in claim 24.

Therefore, the alleged combination of BARHAM et al., YASUDA et al., and PROAKIS et al. could not fairly be construed to disclose the above-mentioned feature of claim 24. Furthermore, Appellant asserts that the reasons for combining BARHAM et al., YASUDA et al., and PROAKIS et al. do not satisfy the requirements of 35 U.S.C. § 103.

For example, with respect to the reasons for combining BARHAM et al. with YASUDA et al., the Examiner alleges (non-final Office Action, p. 5):

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have coefficients storage as taught by Yasuda to the FIR filter of Barham in order to provide an FIR filter that is capable filtering variety of frequency ranges by change the coefficients and without change the hardware.

Appellant submits that the Examiner's allegation is merely a conclusory statement of an alleged benefit of the combination. Such conclusory statements have been repeatedly held to be insufficient for establishing a *prima facie* case of obviousness. In this respect, Appellant relies upon KSR, 550 U.S. at 398, 82 U.S.P.Q.2d at 1385 (citing Kahn, 441 F.3d at 988, 78 U.S.P.Q.2d at 1329), where it was held that rejections on obviousness grounds cannot be sustained by mere conclusory statements;

instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness.

Furthermore, the Examiner does not explain how combining YASUDA et al.'s alleged coefficient storage with BARHAM et al.'s alleged FIR filter would provide the alleged benefit. Therefore, the Examiner's allegations fall short of providing the articulated reasoning required by KSR.

Additionally, with respect to the reasons for combining PROAKIS et al. with the alleged combination of BARHAM et al. and YASUDA et al., the Examiner asserts (non-final Office Action, p. 5):

[I]t would have been obvious to one of ordinary skill in the art at the time the invention was made to have bandpass transformation as taught by Proakis to the FIR filter of Barham as modified by Yasuda in order to provide an FIR filter that can perform frequency transformations either in analog or digital domain.

As with the Examiner's earlier allegation, Appellant submits that this allegation is merely a conclusory statement of an alleged benefit of the combination, which is insufficient for establishing a *prima facie* case of obviousness (*see KSR*, 550 U.S. at 398, 82 U.S.P.Q.2d at 1385 (citing Kahn, 441 F.3d at 988, 78 U.S.P.Q.2d at 1329)). Furthermore, the Examiner does not explain how combining PROAKIS et al.'s alleged bandpass transformation with BARHAM et al. and YASUDA et al.'s alleged FIR filter would provide the alleged benefit. Therefore, the Examiner's allegations fall short of providing the articulated reasoning required by KSR.

For at least the foregoing reasons, Appellant submits that the rejection of claim 24 under 35 U.S.C. § 103(a) based on YASUDA et al., BARHAM et al., and PROAKIS et al. is improper. Accordingly, Appellant requests that the rejection be reversed.

Claims 25, 26, and 37-40 depend from claim 24. Therefore, Appellant requests that the rejection of these claims be reversed for at least the reasons given above with respect to claim 24.

B. The rejection of claims 8 and 36 under 35 U.S.C. § 103(a) as unpatentable over BARHAM et al., in view of YASUDA et al., further in view of PROAKIS et al., and still further in view of DUNLOP et al. should be reversed.

1. Claim 8

Claim 8 depends from claim 1. Without acquiescing in the rejection of claim 8, Appellant submits that the disclosure of DUNLOP et al. does not remedy the deficiencies in the disclosures of BARHAM et al., YASUDA et al., and PROAKIS et al. set forth above with respect to claim 1. Therefore, BARHAM et al., YASUDA et al., PROAKIS et al., and DUNLOP et al., whether taken alone or in any reasonable combination, do not disclose or suggest the features recited in claim 8. Moreover, claim 8 recites additional features not disclosed or suggested by the cited references.

For instance, the cited references do not disclose or suggest that **an analog to digital converter, a plurality of digital receivers, and a non-volatile storage are implemented on a single integrated circuit**, as recited in claim 8. The Examiner concedes that BARHAM et al., YASUDA et al., and PROAKIS et al. do not disclose the above feature, and relies on col. 3, line 50-col. 4, line 38; col. 8, lines 27-39; and Fig. 2 of DUNLOP et al. for allegedly disclosing "a single integrated circuit (e.g., a line card in a single chip)" (non-final Office Action, p. 10). Appellant submits that neither these sections nor any other sections of DUNLOP et al. disclose or suggest the above feature of claim 8. Therefore, the Examiner has not established a *prima facie* case of obviousness with respect to claim 8.

At col. 3, line 40-col. 4, line 38, which describes Fig. 2 of DUNLOP et al., DUNLOP et al. discloses a "reconfigurable network interface card [NIC]." The NIC includes, *inter alia*, an FPGA 12 and a programmable processor 14. This section of DUNLOP et al. does not disclose or suggest an analog to digital converter, a plurality of digital receivers, and a non-volatile storage are

implemented on a single integrated circuit, as recited in claim 8. There is no discussion in this section of DUNLOP et al. to support the Examiner's allegation.

At col. 8, lines 27-39, DUNLOP et al. discloses:

As suggested earlier, the NIC 20 may also be used as a "line card" located at a central site or base station of a given network. In such a case, the NIC 20 would be configured according to the operating protocol of the network to which the site or station belongs. Further, although the FPGA 12 and the processor 14 are shown as separate components in the drawing, it will be understood that the FPGA and the processor may be embodied within a single integrated circuit device, together with other components of the NIC 20. Further, the host device may be combined with these components to create an entire system on a single chip.

This section of DUNLOP et al. discloses, *inter alia*, that an FPGA and processor may be embodied within a single integrated circuit device. However, this section of DUNLOP et al. does not disclose or suggest an analog to digital converter, a plurality of digital receivers, and a non-volatile storage are implemented on a single integrated circuit, as recited in claim 8. There is no discussion in this section of DUNLOP et al. to support the Examiner's allegation.

Further, the Examiner has not explained how any of the above sections of DUNLOP et al. could be reasonably construed as disclosing or suggesting that an analog to digital converter, a plurality of digital receivers, and a non-volatile storage are implemented on a single integrated circuit, as recited in claim 8. Thus, the Examiner has not established a *prima facie* case of obviousness with respect to claim 8.

For at least the foregoing reasons, Appellant submits that the rejection of claim 8 under 35 U.S.C. § 103(a) based on BARHAM et al., YASUDA et al., PROAKIS et al., and DUNLOP et al. is improper. Accordingly, Appellant requests that the rejection be reversed.

2. Claim 36

Claim 36 depends from claim 24. Initially, Appellant notes that a specific ground of rejection is not provided for claim 36 (*see* non-final OfficeAction, pp. 9-10). Therefore, the Examiner has not established a *prima facie* case of obviousness with respect to claim 36.

Nevertheless, without acquiescing in the rejection of claim 36, Appellant submits that the disclosure of DUNLOP et al. does not remedy the deficiencies in the disclosures of BARHAM et al., YASUDA et al., and PROAKIS et al. set forth above with respect to claim 24. Therefore, BARHAM et al., YASUDA et al., PROAKIS et al., and DUNLOP et al., whether taken alone or in any reasonable combination, do not disclose or suggest the features recited in claim 36. Moreover, claim 36 recites additional features not disclosed or suggested by BARHAM et al., YASUDA et al., PROAKIS et al., and DUNLOP et al.

For instance, BARHAM et al., YASUDA et al., PROAKIS et al., and DUNLOP et al. do not disclose or suggest that **an analog to digital converter, a plurality of digital receivers, and a non-volatile storage are implemented on a single integrated circuit**, as recited in claim 36. In the rejection of claim 8, the Examiner concedes that BARHAM et al., YASUDA et al., and PROAKIS et al. do not disclose the above feature, and relies on col. 3, line 50-col. 4, line 38; col. 8, lines 27-39; and Fig. 2 of DUNLOP et al. for allegedly disclosing "a single integrated circuit (e.g., a line card in a single chip)" (non-final Office Action, p. 10). Appellant submits that neither these sections nor any other sections of DUNLOP et al. disclose or suggest the above feature of claim 36. Therefore, the Examiner has not established a *prima facie* case of obviousness with respect to claim 36.

At col. 3, line 40-col. 4, line 38, which describes Fig. 2 of DUNLOP et al., DUNLOP et al. discloses a "reconfigurable network interface card [NIC]." The NIC includes, *inter alia*, an FPGA 12 and a programmable processor 14. This section of DUNLOP et al. does not disclose or suggest an analog to digital converter, a plurality of digital receivers, and a non-volatile storage are implemented on a single integrated circuit, as recited in claim 36. There is no discussion in this section of DUNLOP et al. to support the Examiner's allegation.

At col. 8, lines 27-39, DUNLOP et al. discloses, *inter alia*, that an FPGA and processor may be embodied within a single integrated circuit device. However, this section of DUNLOP et al. does

not disclose or suggest an analog to digital converter, a plurality of digital receivers, and a non-volatile storage are implemented on a single integrated circuit, as recited in claim 36. There is no discussion in this section of DUNLOP et al. to support the Examiner's allegation.

Further, the Examiner has not explained how any of the above sections of DUNLOP et al. could be reasonably construed as disclosing or suggesting that an analog to digital converter, a plurality of digital receivers, and a non-volatile storage are implemented on a single integrated circuit, as recited in claim 36. Thus, the Examiner has not established a *prima facie* case of obviousness with respect to claim 36.

For at least the foregoing reasons, Appellant submits that the rejection of claim 36 under 35 U.S.C. § 103(a) based on BARHAM et al., YASUDA et al., PROAKIS et al., and DUNLOP et al. is improper. Accordingly, Appellant requests that the rejection be reversed.

C. The rejection of claims 5-7, 13, 27-29, and 33 under 35 U.S.C. § 103(a) as unpatentable over BARHAM et al., in view of YASUDA et al., further in view of PROAKIS et al., and still further in view of QUIGLEY et al. should be reversed.

1. Claims 5, 6 and 13

Claims 5, 6, and 13 depend from claim 1. Without acquiescing in the rejection of claims 5, 6, and 13, the disclosure of QUIGLEY et al. does not remedy the deficiencies in the disclosures of BARHAM et al., YASUDA et al., and PROAKIS et al. set forth above with respect to claim 1. Therefore, BARHAM et al., YASUDA et al., PROAKIS et al., and QUIGLEY et al., whether taken alone or in any reasonable combination, do not disclose or suggest the features recited in claims 5, 6, and 13. For at least the foregoing reasons, Appellant submits that the rejection of claims 5, 6, and 13 under 35 U.S.C. § 103(a) based on BARHAM et al., YASUDA et al., PROAKIS et al., and QUIGLEY et al. is improper. Accordingly, Appellant requests that the rejection be reversed.

2. Claim 7

Claim 7 depends from claim 1. Without acquiescing in the rejection of claim 7, the disclosure of QUIGLEY et al. does not remedy the deficiencies in the disclosures of BARHAM et al., YASUDA et al., and PROAKIS et al. set forth above with respect to claim 1. Therefore, BARHAM et al., YASUDA et al., PROAKIS et al., and QUIGLEY et al., whether taken alone or in any reasonable combination, do not disclose or suggest the features recited in claim 7.

Furthermore, claim 7 recites that **the ratio of the number of upstream channels demodulated by a CMTS channel bank to a number of upstream input connectors of the CMTS channel bank is M, where M is 16**. BARHAM et al., YASUDA et al., PROAKIS et al., and QUIGLEY et al., whether taken alone or in any reasonable combination, do not disclose or suggest the above feature of claim 7.

The Examiner alleges that the above feature is merely a matter of design choice (non-final Office Action, p. 12). Appellant respectfully disagrees with the Examiner's allegation that the above feature is merely a matter of design choice. Moreover, in accordance with the Examiner's duty to establish a *prima facie* case of obviousness, the Examiner has not presented any evidence to support the Examiner's allegation that the above feature of claim 7 is merely a matter of design choice.

In fact, Appellant respectfully submits that it is not merely a matter of design choice for the ratio of the number of upstream channels demodulated by the CMTS channel bank to a number of upstream input connectors of the CMTS channel bank to be M, where M is 16, as recited in claim 7. For instance, as described in Appellant's Specification at p. 5, lines 21-24 and p. 6, lines 10-11, "In prior art channel bank systems, every upstream channel requires a respective splitter tap, receiver input including a bulkhead-mount connector, and cabling between the splitter tap and the receiver input. . . . What is needed is a receiver channel bank architecture that permits miniaturization of line cards and channel banks by reducing the number of connectors required." Thus, Appellant respectfully submits that the above feature of claim 7 is not merely a design choice, as alleged by the

Examiner. For at least this reason, the Examiner has failed to establish a *prima facie* case of obviousness with respect to claim 7.

Therefore, the alleged combination of BARHAM et al., YASUDA et al., PROAKIS et al., and QUIGLEY et al. could not fairly be construed to disclose the above-mentioned feature of claim 7. Furthermore, Appellant asserts that the reasons for combining BARHAM et al., YASUDA et al., PROAKIS et al., and QUIGLEY et al. do not satisfy the requirements of 35 U.S.C. § 103.

For example, with respect to the reasons for combining QUIGLEY et al. with BARHAM et al., YASUDA et al., and PROAKIS et al., the Examiner alleges (non-final Office Action, pp. 11-12):

[I]t would have been obvious to one of ordinary skill in the art at the time the invention was made to have the CMTS as taught by Quigley to the FIR filter of Barham as modified by Yasuda and Proakis in order to enhance the data rate and/or reliability of upstream communications.

Appellant submits that the Examiner's allegation is merely a conclusory statement of an alleged benefit of the combination. Such conclusory statements have been repeatedly held to be insufficient for establishing a *prima facie* case of obviousness. In this respect, Appellant relies upon KSR, 550 U.S. at 398, 82 U.S.P.Q.2d at 1385 (citing Kahn, 441 F.3d at 988, 78 U.S.P.Q.2d at 1329), where it was held that rejections on obviousness grounds cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness.

Furthermore, the Examiner does not explain how combining QUIGLEY et al.'s alleged CMTS with YASUDA et al., BARHAM et al., and PROAKIS et al.'s alleged modified FIR filter would provide the benefit set forth by the Examiner. In fact, Appellant submits that this allegation does not make sense. It is unclear as to how one would add a CMTS to a FIR filter, or how such a combination would enhance data rate and/or reliability of the FIR filter, as alleged by the Examiner. This alleged combination is clearly formed based on impermissible hindsight in order to reconstruct

Appellant's claim. Therefore, the Examiner's allegations fall short of providing the articulated reasoning required by KSR.

For at least the foregoing additional reasons, Appellant submits that the rejection of claim 7 under 35 U.S.C. § 103(a) based on YASUDA et al., BARHAM et al., PROAKIS et al., and QUIGLEY et al. is improper. Accordingly, Appellant requests that the rejection be reversed.

3. Claims 27, 28, and 33

Claims 27, 28, and 33 depend from claim 24. Without acquiescing in the rejection of claims 27, 28, and 33, the disclosure of QUIGLEY et al. does not remedy the deficiencies in the disclosures of BARHAM et al., YASUDA et al., and PROAKIS et al. set forth above with respect to claim 24. Therefore, BARHAM et al., YASUDA et al., PROAKIS et al., and QUIGLEY et al., whether taken alone or in any reasonable combination, do not disclose or suggest the features recited in claims 27, 28, and 33. For at least the foregoing reasons, Appellant submits that the rejection of claims 27, 28, and 33 under 35 U.S.C. § 103(a) based on BARHAM et al., YASUDA et al., PROAKIS et al., and QUIGLEY et al. is improper. Accordingly, Appellant requests that the rejection be reversed.

4. Claim 29

Claim 29 depends from claim 24. Without acquiescing in the rejection of claim 29, the disclosure of QUIGLEY et al. does not remedy the deficiencies in the disclosures of BARHAM et al., YASUDA et al., and PROAKIS et al. set forth above with respect to claim 24. Therefore, BARHAM et al., YASUDA et al., PROAKIS et al., and QUIGLEY et al., whether taken alone or in any reasonable combination, do not disclose or suggest the features recited in claim 29.

Furthermore, claim 29 recites that **the ratio of the number of upstream channels demodulated by a CMTS channel bank to a number of upstream input connectors of the CMTS channel bank is M, where M is 16**. BARHAM et al., YASUDA et al., PROAKIS et al.,

and QUIGLEY et al., whether taken alone or in any reasonable combination, do not disclose or suggest the above feature of claim 29.

The Examiner alleges that the above feature is merely a matter of design choice (non-final Office Action, p. 12). Appellant respectfully disagrees with the Examiner's allegation that the above feature is merely a matter of design choice. Moreover, in accordance with the Examiner's duty to establish a *prima facie* case of obviousness, the Examiner has not presented any evidence to support the Examiner's allegation that the above feature of claim 29 is merely a matter of design choice.

In fact, Appellant respectfully submits that it is not merely a matter of design choice for the ratio of the number of upstream channels demodulated by the CMTS channel bank to a number of upstream input connectors of the CMTS channel bank to be M, where M is 16, as recited in claim 29. For instance, as described in Appellant's Specification at p. 5, lines 21-24 and p. 6, lines 10-11, "In prior art channel bank systems, every upstream channel requires a respective splitter tap, receiver input including a bulkhead-mount connector, and cabling between the splitter tap and the receiver input. . . . What is needed is a receiver channel bank architecture that permits miniaturization of line cards and channel banks by reducing the number of connectors required." Thus, Appellant respectfully submits that the above feature of claim 29 is not merely a design choice, as alleged by the Examiner. For at least this reason, the Examiner has failed to establish a *prima facie* case of obviousness with respect to claim 29.

Therefore, the alleged combination of BARHAM et al., YASUDA et al., PROAKIS et al., and QUIGLEY et al. could not fairly be construed to disclose the above-mentioned feature of claim 29. Furthermore, Appellant asserts that the reasons for combining BARHAM et al., YASUDA et al., PROAKIS et al., and QUIGLEY et al. do not satisfy the requirements of 35 U.S.C. § 103.

For example, with respect to the reasons for combining QUIGLEY et al. with BARHAM et al., YASUDA et al., and PROAKIS et al., the Examiner alleges (non-final Office Action, pp. 11-12) (citation omitted):

[I]t would have been obvious to one of ordinary skill in the art at the time the invention was made to have the CMTS as taught by Quigley to the FIR filter of Barham as modified by Yasuda and Proakis in order to enhance the data rate and/or reliability of upstream communications.

Appellant submits that the Examiner's allegation is merely a conclusory statement of an alleged benefit of the combination. Such conclusory statements have been repeatedly held to be insufficient for establishing a *prima facie* case of obviousness. In this respect, Appellant relies upon KSR, 550 U.S. at 398, 82 U.S.P.Q.2d at 1385 (citing Kahn, 441 F.3d at 988, 78 U.S.P.Q.2d at 1329), where it was held that rejections on obviousness grounds cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness.

Furthermore, the Examiner does not explain how combining QUIGLEY et al.'s alleged CMTS with YASUDA et al., BARHAM et al., and PROAKIS et al.'s alleged modified FIR filter would provide the benefit set forth by the Examiner. In fact, Appellant submits that this allegation does not make sense. It is unclear as to how one would add a CMTS to a FIR filter, or how such a combination would enhance data rate and/or reliability of the FIR filter, as alleged by the Examiner. This alleged combination is clearly formed based on impermissible hindsight in order to reconstruct Appellant's claim. Therefore, the Examiner's allegations fall short of providing the articulated reasoning required by KSR.

For at least the foregoing additional reasons, Appellant submits that the rejection of claim 29 under 35 U.S.C. § 103(a) based on YASUDA et al., BARHAM et al., PROAKIS et al., and QUIGLEY et al. is improper. Accordingly, Appellant requests that the rejection be reversed.

D. The rejection of claims 14, 15, 34, and 35 under 35 U.S.C. § 103(a) as unpatentable over BARHAM et al., in view of YASUDA et al., further in view of PROAKIS et al., further in view of QUIGLEY et al., and still further in view of PEYROVIAN should be reversed.

1. Claims 14 and 15

Claims 14 and 15 depend from claim 1. Without acquiescing in the rejection of claims 14 and 15, the disclosure of PEYROVIAN does not remedy the deficiencies in the disclosures of BARHAM et al., YASUDA et al., PROAKIS et al., and QUIGLEY et al. set forth above with respect to claim 1. Therefore, BARHAM et al., YASUDA et al., PROAKIS et al., QUIGLEY et al., and PEYROVIAN, whether taken alone or in any reasonable combination, do not disclose or suggest the features recited in claims 14 and 15.

Moreover, Appellant notes that the Examiner is citing no less than *five* references in rejecting these claims. Appellant submits that the Examiner is merely using impermissible hindsight to piece together a large number of references in order to attempt to arrive at Appellant's claims.

For at least the foregoing reasons, Appellant submits that the rejection of claims 14 and 15 under 35 U.S.C. § 103(a) based on BARHAM et al., YASUDA et al., PROAKIS et al., QUIGLEY et al., and PEYROVIAN is improper. Accordingly, Appellant requests that the rejection be reversed.

2. Claims 34 and 35

Claims 34 and 35 depend from claim 24. Without acquiescing in the rejection of claims 34 and 35, the disclosure of PEYROVIAN does not remedy the deficiencies in the disclosures of BARHAM et al., YASUDA et al., PROAKIS et al., and QUIGLEY et al. set forth above with respect to claim 24. Therefore, BARHAM et al., YASUDA et al., PROAKIS et al., QUIGLEY et al., and PEYROVIAN, whether taken alone or in any reasonable combination, do not disclose or suggest the features recited in claims 34 and 35.

Moreover, Appellant notes that the Examiner is citing no less than *five* references in rejecting these claims. Appellant submits that the Examiner is merely using impermissible hindsight to piece together a large number of references in order to attempt to arrive at Appellant's claims.

For at least the foregoing reasons, Appellant submits that the rejection of claims 34 and 35 under 35 U.S.C. § 103(a) based on BARHAM et al., YASUDA et al., PROAKIS et al., QUIGLEY et al., and PEYROVIAN is improper. Accordingly, Appellant requests that the rejection be reversed.

E. The rejection of claims 9, 10, 12, and 30-32 under 35 U.S.C. § 103(a) as unpatentable over BARHAM et al., in view of YASUDA et al., further in view of PROAKIS et al., further in view of QUIGLEY et al., and still further in view of Appellant's Fig. 17(A) should be reversed.

1. Claims 9, 10, and 12

Claims 9, 10, and 12 depend from claim 1. Without acquiescing in the rejection of claims 9, 10, and 12, Appellant's Fig. 17(A) does not remedy the deficiencies in the disclosures of BARHAM et al., YASUDA et al., PROAKIS et al., and QUIGLEY et al. set forth above with respect to claim 1. Therefore, BARHAM et al., YASUDA et al., PROAKIS et al., QUIGLEY et al., and Appellant's Fig. 17(A), whether taken alone or in any reasonable combination, do not disclose or suggest the features recited in claims 9, 10, and 12.

Moreover, Appellant notes that the Examiner is citing no less than *five* references in rejecting these claims. Appellant submits that the Examiner is merely using impermissible hindsight to piece together a large number of references in order to attempt to arrive at Appellant's claims.

For at least the foregoing reasons, Appellant submits that the rejection of claims 9, 10, and 12 under 35 U.S.C. § 103(a) based on BARHAM et al., YASUDA et al., PROAKIS et al., QUIGLEY et al., and Appellant's Fig., 17(A) is improper. Accordingly, Appellant requests that the rejection be reversed.

2. Claims 30-32

Claims 30-32 depend from claim 24. Without acquiescing in the rejection of claims 30-32, Appellant's Fig. 17(A) does not remedy the deficiencies in the disclosures of BARHAM et al., YASUDA et al., PROAKIS et al., and QUIGLEY et al. set forth above with respect to claim 24. Therefore, BARHAM et al., YASUDA et al., PROAKIS et al., QUIGLEY et al., and Appellant's Fig. 17(A), whether taken alone or in any reasonable combination, do not disclose or suggest the features recited in claims 30-32.

Moreover, Appellant notes that the Examiner is citing no less than *five* references in rejecting these claims. Appellant submits that the Examiner is merely using impermissible hindsight to piece together a large number of references in order to attempt to arrive at Appellant's claims.

For at least the foregoing reasons, Appellant submits that the rejection of claims 30-32 under 35 U.S.C. § 103(a) based on BARHAM et al., YASUDA et al., PROAKIS et al., QUIGLEY et al., and Appellant's Fig., 17(A) is improper. Accordingly, Appellant requests that the rejection be reversed.

VIII. CONCLUSION

In view of the foregoing arguments, Appellant respectfully solicits the Honorable Board to reverse the Examiner's rejections of claims 1, 3-10, 12-17, and 22-40.

To the extent necessary, a petition for an extension of time under 37 C.F.R. § 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account 50-1070 and please credit any excess fees to such deposit account.

Respectfully submitted,

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IX. APPENDIX

1. A method for provisioning multiple digital receivers, comprising:
providing an analog to digital converter having an analog input and a digital output;
providing a plurality of digital receivers, each receiver having a programmable center frequency,
where the plurality of digital receivers are to receive digitized samples from the analog to digital converter and where each of the plurality of digital receivers includes a low-pass digital filter;
maintaining pre-computed sets of filter coefficients in non-volatile storage, each set corresponding to one of the plurality of low-pass digital filters, each filter having one of a predetermined set of bandwidths;
receiving a request to provision a selected one of the plurality of digital receivers;
selecting a first center frequency and a first bandpass bandwidth for provisioning the selected one of the plurality of digital receivers;
retrieving the filter coefficients associated with the first bandpass bandwidth;
subjecting the retrieved filter coefficients to a bandpass transformation corresponding to the first center frequency; and
loading the transformed filter coefficients into coefficient latches in the selected one of the plurality of digital receivers.
2. (canceled)
3. The method of claim 1, further including:
operating the selected one of the plurality of digital receivers at the first center

frequency;

subsequent to said operating, loading the coefficient latches in the selected one of the plurality of digital receivers with transformed coefficients corresponding to a second center frequency; and

operating the selected one of the plurality of digital receivers at the second center frequency.

4. The method of claim 3, further including:

selecting a third center frequency and a second bandpass bandwidth for provisioning a second one of the plurality of digital receivers, where said first and second bandpass bandwidths are unequal;

retrieving the filter coefficients associated with the third bandwidth;

subjecting the retrieved filter coefficients to a bandpass transformation corresponding to the third center frequency; and

loading the transformed coefficients into coefficient latches in the second one of the plurality of digital receivers.

5. The method of claim 1, where the analog to digital converter and the plurality of digital receivers are located within the upstream section of a cable modem termination system (CMTS) channel bank organized into upstream and downstream channels.

6. The method of claim 5, where the ratio of the number of upstream channels demodulated by the CMTS channel bank to a number of upstream input connectors of the CMTS channel bank is M.

7. The method of claim 6, where M is 16.
8. The method of claim 1, where the analog to digital converter, the plurality of digital receivers, and the non-volatile storage are implemented on a single integrated circuit.
9. The method of claim 5, where the CMTS channel bank is organized using a plurality of modules, each module having a plurality of downstream channels and a plurality of upstream channels.
10. The method of claim 9, where a number of the upstream channels is 4 times a number of the downstream channels.
11. (canceled)
12. The method of claim 5, where the CMTS channel bank has 4 times as many upstream channels as downstream channels.
13. The method of claim 5, where the CMTS is DOCSIS compatible.
14. The method of claim 5, where the upstream channels are in the 750-1000 MHz portion of the spectrum.
15. The method of claim 14, where at least one frequency stacker is used to densely pack

each sub-band of the 750-1000 MHz spectrum portion.

16. The method of claim 1, where each of the plurality of digital receivers includes a finite impulse response (FIR) digital filter.

17. The method of claim 16, where one or more of said FIR digital filters is an Optimum Equiripple Linear-Phase filter.

18-21. (canceled)

22. The method of claim 1, where a number of the filter coefficients for each of the low-pass digital filters is at least 16.

23. The method of claim 1, where a number of the filter coefficients for each of the low-pass digital filters is at most 24.

24. A system for provisioning multiple digital receivers, comprising:
an analog to digital converter having an analog input and a digital output;
a plurality of digital receivers, each of the plurality of digital receivers having a programmable center frequency, and each of the plurality of digital receivers including a low-pass digital filter;
means for coupling digitized samples to the plurality of digital receivers;
means for maintaining pre-computed sets of filter coefficients in non-volatile storage, each set corresponding to one of plurality of low-pass digital filters, each filter having one of a

predetermined set of bandwidths;

means for receiving a request to provision a selected one of the plurality of digital receivers;

means for selecting a first center frequency and a first bandpass bandwidth for provisioning the selected one of the plurality of digital receivers;

means for retrieving the filter coefficients associated with the first bandpass bandwidth;

means for subjecting the retrieved filter coefficients to a bandpass transformation corresponding to the first center frequency; and

means for loading the transformed filter coefficients into coefficient latches in the selected one of the plurality of digital receivers.

25. The system of claim 24, further including:

means for operating the selected one of the plurality of digital receivers at the first center frequency;

means for loading, subsequent to said operating, the coefficient latches in the selected one of the plurality of digital receivers with transformed coefficients corresponding to a second center frequency; and

means for operating the selected one of the plurality of digital receivers at the second center frequency.

26. The system of claim 25, further including:

means for selecting a third center frequency and a second bandpass bandwidth for provisioning a second one of the plurality of digital receivers, where said first and second bandpass

bandwidths are unequal;

means for retrieving the filter coefficients associated with the third bandwidth;

means for subjecting the retrieved filter coefficients to a bandpass transformation corresponding to the third center frequency; and

means for loading the transformed coefficients into coefficient latches in the second one of the plurality of digital receivers.

27. The system of claim 24, where the analog to digital converter and the plurality of digital receivers are located within the upstream section of a CMTS channel bank organized into upstream and downstream channels.

28. The system of claim 27, where the ratio of the number of upstream channels demodulated by the CMTS channel bank to a number of upstream input connectors of the CMTS channel bank is M.

29. The system of claim 28, where M is 16.

30. The system of claim 27, where the CMTS channel bank is organized using a plurality of modules, each module having a plurality of downstream channels and a plurality of upstream channels.

31. The system of claim 30, where a number of the upstream channels is 4 times a number of the downstream channels.

32. The system of claim 27, where the CMTS channel bank has 4 times as many upstream channels as downstream channels.

33. The system of claim 27, where the CMTS is DOCSIS compatible.

34. The system of claim 27, where the upstream channels are in the 750-1000 MHz portion of the spectrum.

35. The system of claim 34, where at least one frequency stacker is used to densely pack each sub-band of the 750-1000 MHz spectrum portion.

36. The system of claim 24, where the analog to digital converter, the plurality of digital receivers, and the non-volatile storage are implemented on a single integrated circuit.

37. The system of claim 24, where each of the plurality of digital receivers includes a FIR digital filter.

38. The system of claim 37, where one or more of said FIR digital filters is an Optimum Equiripple Linear-Phase filter.

39. The system of claim 24, where a number of the filter coefficients for each filter is at least 16.

40. The system of claim 24, where a number of the filter coefficients for each filter is less

than or equal to 24.

X. EVIDENCE APPENDIX

None

XI. RELATED PROCEEDINGS APPENDIX

None